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Review Article

Miracle Plant Turmeric: Review

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Abstract

Plants contain various components rich in phytochemicals, which have diverse biological and pharmacological properties. Plants with these properties are currently of great interest for their natural antioxidant properties, which can help prevent cell destruction caused by reactive oxygen species (ROS) and free radicals. Turmeric, traditionally used as a food flavoring and preservative, has garnered significant attention for its potential health benefits. Turmeric has a wide variety of medicinal properties. These properties include antioxidant, anti-inflammatory agent, anti-cancer agent, anti-metabolic syndrome, antimicrobial effects, anti-arthritis, anti-viral, anti-asthma and anti-diabetic, anti-obesity, cardio, liver toxicity protection activity.

1. Introduction

Curcuma longa L. (turmeric), a miraculous plant, is a member of the Zingiberaceae family [1]. Turmeric, a tuberous, herbaceous, and perennial plant with yellow flowers and broad leaves, is generally distributed in tropical and subtropical regions, especially Asia [2] C. *longa* L. is mainly grown in India. Besides India, it is also grown in China, Taiwan, Indonesia, Sri Lanka and other tropical countries. The highest diversity is concentrated in India and Thailand [3]. Turmeric, thought to have been used approximately 2500 years ago, constitutes the main ingredient of curry powder, which is widely used in Asian cuisine [4]. The use of turmeric was first mentioned in the scientific field in 1937, and positive results were obtained on its antibacterial properties in 1949 [5].

The chemical content of C. *longa* has been extensively studied. It contains various components such as phenolic compounds, terpenes, phytosterols, and essential oils. Some of the reported bioactive phenolic compounds include dimethoxycurcumin, dihydrocurcumin, tetrahydrobisdemethoxycurcumin, digalloyl-hexoside, caffeic acid hexoside, curdione, coumaric, caffeic acid, sinapic acid, quercetin-3-D-galactoside, casuarinin, bisdemethoxycurcumin, curcuminol, demethoxycurcumin, isorhamnetin, valoneic acid bilactone, curcumin, and curcumin-O-glucuronide [6, 7].

At the same time, various terpenes, including monoterpenes and sesquiterpenes, have been reported in C. *longa* extracts. β-Phellandrene and terpinolene from monoterpenes, turmerone B, turmerone A, (E)-α-atlantone, dihydro bisdemethoxycurcumin, ar-Turmerone, and α-Zingiberene from sesquiterpenes were detected [8–10]. Other chemical components include stigmasterol, b-sitosterol, stigmast-4-en-3-one, and one monoterpene, terpinene-4-ol [11].

2. Medical Significance of Turmeric

Turmeric has a wide variety of medicinal properties. These properties include antioxidant, anti-ınflammatory agent, anti-cancer agent, anti-metabolic syndrome, antimicrobial effects, anti-arthritis, anti-viral, anti-asthma and anti-diabetic, anti-obesity, cardio, liver toxicity protection activity [12–21].

In 2018, Abdollahi et al. [22] 's study on inflammatory and immune system diseases determined that turmeric could affect different immune cells, especially T lymphocyte subsets, macrophages, dendritic cells, B lymphocytes, and natural killer cells [22]. A study on non-alcoholic fatty liver disease found it to be a dietary polyphenol with lipid modifier, antioxidant, and anti-inflammatory properties [23]. Another similar randomized controlled study conducted by Saberi-Karimyan found that it positively affected the serum inflammatory cytokine level [24].
It has been stated that turmeric reduces the increase in serum creatine and blood urea nitrogen (BUN), which are kidney function tests in rats treated with acute renal failure disease. Positive results have been obtained against nephrotoxicity [25]. In a randomized controlled study by Alveranga et al. [26] which investigated its effect on the expression of inflammatory transcription factors in hemodialysis patients, it was found that there was a decrease in NF-kB mRNA expression and hsCRP values in patients administered turmeric for three months [26].
A double-blind therapeutic study investigating the effect of orally taken turmeric as an antioxidant in Amyotrophic Lateral Sclerosis (ALS) reported that it reduced oxidative stress caused by the imbalance between free radicals and antioxidants in the body. It has also been found to stop the progression of the disease [27].
As a result of the study conducted to examine the lipid-lowering effect of turmeric in patients with metabolic syndrome, It was found that the level of high-density lipoprotein cholesterol (HDL-C) increased and the level of low-density lipoprotein cholesterol (LDL) decreased [28].
As a result of the turmeric supplement applied to patients with Type 2 diabetes by Panahi and his colleagues, it was determined that the LDL level decreased. In contrast, the HDL level increased [29].
In a study conducted by Masoodi et al. [30] to examine the effect of turmeric on ulcerative colitis symptoms, it was found that curcuminoid nano micelles reduced the frequency of diarrhea and positively affected the clinical well-being of patients. Nanomicelles are hydrophilic. They dissolve in the acidic stomach environment, and nano micelles emerge. Nanomicelles enter the intestines and are absorbed there, slowing intestinal movement and decreasing stool output [31, 32].

3. Curcumin

Turmeric is essential in medical tresatment primarily due to its most active ingredient, orange-yellow curcumin Figure 1 [33]. Curcumin is the most effective component obtained from the rhizomes of the turmeric plant [34]. The pharmacological properties of curcumin, such as immune regulation, anti-oxidation, anti-inflammatory, anti-tumor, anti-angiogenesis, anti-coagulation, and scavenging of free radicals, have been reported in many studies [34, 35].
The American Food and Drug Administration (FDA) has included curcumin in the definition of a substance generally recognized as safe (GRAS), and it is currently used as a food supplement in many countries [36, 37].

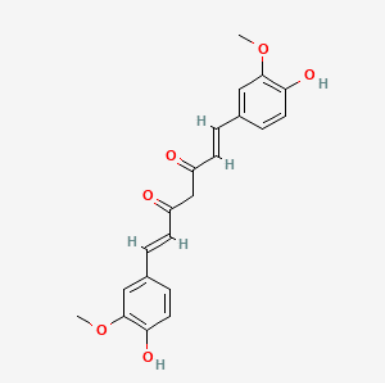

Figure 1: Chemical structure of curcumin.

4. Conclusion

In addition to having been used for centuries for ethnomedical purposes, C. *longa* continues to attract considerable attention due to its phytochemicals and pharmacological activities. Due to its beneficial components, it has the potential for pharmacological use as well as being used as a food additive. Further studies are needed to determine safe dosage and effectiveness.

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